REMARKS

The application includes claims 1-22 prior to entering this amendment.

The examiner rejects claims 1-2, 5-10, 13-16, and 19-22 under 35 U.S.C. § 103(a) as being unpatentable over the Admitted Prior Art in figure 2 (hereinafter referred to as the APA) in view of Bronstein, et al. (U.S. Patent No. 6,633,565).

The examiner objects to claims 3-4, 11-12, and 17-18 as being dependent upon a rejected base claim.

The applicant amends claims 9-14.

The applicant adds new claims 23-27.

The application remains with claims 1-27 after entering this amendment.

The applicant adds no new matter and request reconsideration in view of the following remarks. The applicant points out that the claimed subject matter may be patentably distinguished from the cited reference(s) for multiple reasons; however, the following remarks are believed to be sufficient. Likewise, it is noted that the applicant's failure to comment directly on any of the positions asserted by the examiner in the office action does not indicate agreement or acquiescence with those asserted positions.

Claim Objections

The examiner objects to claims 3-4, 11-12, and 17-18 as being dependent upon a rejected base claim, and indicates that claims 3-4, 11-12, and 17-18 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The applicant thanks Examiner Ho for acknowledging the allowability of these claims. The applicant respectfully requests that this objection be held in abeyance until final disposition of the base claims.

Claim Rejections Under 35 U.S.C. § 103

The examiner rejects claims 1-2, 5-10, 13-16, and 19-22 as being unpatentable over the APA in view of Bronstein. The applicant traverses the rejection for the reasons that follow. As the examiner groups claims 9, 14, and 15 with claim 1 (and rejects claims 9, 14, and 15 "for the

same reasons set forth in the rejection of claim 1"[1]), the applicant addresses claims 1, 9, 14, and 15 together.

The examiner indicates (emphasis added):

> Regarding claim 1, the APA discloses the forwarding engine 58-fig.2 as a first processor for performing a lookup for a received data packet from the port 62-fig.2, see page 10, lines 16- 22, and the received packet destined for one of the ingress ports. The engine 58 processes the packet's header, and should be able to look up information regarding an ingress port identification and appropriate DSP/modem board, and prepends a L2 Ethernet header containing the information addressed to dial shelf 50 (corresponding to using a first processor in the network access server to perform a routing table lookup for a received packet; determining from the results of the routing table lookup, a routing table identifier, and using the identifier to determine the location of the routing information in the routing table).[2]

The applicant is not certain how to interpret the examiner's comment as to what engine 58 *should* be able to do. The applicant's application as filed discloses what the APA *does* do:

> When a packet is received at network interface 60 from IP network 20, a process complementary to the one described above is performed. In short, all packets received on egress port 62 are passed to forwarding engine 58, which modifies each packet's IP header, looks up the appropriate "next hop" DSP/modem board, and places the packet in a FE frame addressed to that DSP/modem board. The frame is then transmitted via FE connector 57 and FE hub 54 to the appropriate DSP/modem board on dial shelf 50.[3]
>
> A second bottleneck is the forwarding engine itself – this single engine must perform forwarding lookup and header manipulation for every packet processed by the access server. Thus if the number of active ingress ports doubles, the demand placed on the forwarding engine also roughly doubles.[4]

In particular, the applicant points out that there is no disclosure of the APA

> *determining, from the results of the routing table lookup, a routing table identifier and a second processor ...;*
>
> *passing the identifier and the received packet to the second processor; and*
>
> *the second processor retrieving routing information for the received packet from a routing table, using the identifier to determine the location of the routing information in the routing table*

as recited (emphasis added) in the applicant's claim 1 (with similar elements in claims 9, 14, and 15). It is not reasonable to construe the APA as being both the "first processor" and the "second

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[1] Office Action, page 4.
[2] Office Action, pages 2-3.
[3] Application as filed, page 10, lines 16-22.
[4] Application as filed, page 11, lines 6-10.

processor" and somehow "passing the identifier" to itself – particularly since there is no disclosure of the APA determining, passing, or using a routing table identifier. At least for this reason, the rejection is traversed.

The examiner continues:

> The APA, however, does not expressly teach a second processor, selected among a plurality of forwarding processors, responsible for processing and forwarding the received packet.
>
> One skill in the art would recognize the advantage of having a second processor for processing and forwarding the received packet so that the NAS can better handle large numbers of input streams, large numbers of output destinations and lines, etc.
>
> Bronstein discloses apparatus for and method of flow switching in a data communications network. In Bronstein, the forwarding decision processor 112, in addition to the processing unit 116-fig.7, is responsible for forwarding packets, which have been tagged from the table 82- fig.5, see col. 10, lines 36-67, and col. 12-line 34 to col. 14-line 5.
>
> At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the APA with Bronstein.
>
> The suggestion/motivation for doing so would have been to better handle a large numbers of output destinations and lines without delay.
>
> Therefore, it would have been obvious to combine the APA with Bronstein to obtain the invention as specified in claim 1.[5]

The applicant is unclear as to whether the examiner is alleging that "having a second processor" is obvious (and Bronstein is simply an example of a second processor), and/or that the APA combined with Bronstein teaches or suggests the applicant's inventions of claims 1, 9, 14, and 15.

The applicant cannot dispute that merely including a plurality of processors is known. The applicant does dispute, however, that the applicant's claims are obvious merely because there are multiple processors recited. As stated in MPEP 2143.03:

> To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The applicant points out that the examiner has not clearly shown where the combination of the APA and Bronstein teaches or suggests *all* of the elements of the applicant's claims 1, 9, 14, and 15. For example, the applicant refers to the routing table identifier recited in claims 1 and 15,

[5] Office Action, page 3.

and to the result(s) of the routing search recited in claims 9 and 14. The examiner has not clearly indicated how these elements of the applicant's claims, among others, are taught or suggested in the combination of the APA and Bronstein. Having addressed this with regard to the APA above, the applicant next addresses Bronstein.

The examiner apparently would read the applicant's "first processor" and "second processor" (as recited in the applicant's claims 1 and 15) or "distribution engine" and "forwarding engines" (as recited in the applicant's claim 9, with similar elements in claim 14) on Bronstein's forwarding decision processor and "processing unit 116", though the correspondence is not clearly stated. Further, it is unclear if the examiner's reference to "processing unit 116" refers to Bronstein's header analyzer/tag switching unit 116, or to Bronstein's I/O processing unit. Due to the lack of specificity in the rejection, the applicant addresses Bronstein in general and explains why Bronstein (alone or in combination with the APA) does not teach or suggest all of the elements of any of the applicant's inventions of claims 1, 9, 14, or 15.

Bronstein discloses an "apparatus and associated method for performing flow switching (tag switching) in a frame switching environment."[6] Bronstein's flow switching apparatus is a switch, not a router.[7] Bronstein provides only a few references to routing, such as:

> The flow switching apparatus 10 may be implemented as part of a network switch or other network element. An example is an Ethernet switch that is capable of communication over a variety of data formats and speeds. For example, I/O processing units 12 may be adapted to communicate with standard Ethernet (10 BaseT), Fast Ethernet (100 BastT), Gigabit Ethernet (1000 BaseT) or ATM signal protocols. In addition to providing Layer 2 switching, the network switch may also be adapted to provide support for VLANs, Bridging, LANE, MPOA, IP Routing, for example.[8]

The distinction between routing and switching is well known in networking, and there is little teaching or suggestion in Bronstein of portions of Bronstein's flow switching apparatus performing routing:

> In accordance with the invention, it is not necessary that the input port have any knowledge of the operation of the next stage, i.e., the next stage in this example being the switch controller. The next stage in general comprises the necessary intelligence to perform the intended function. Examples of an intelligent node functioning as the next stage include but are not limited to routing, bridging, NIC, edge device, etc. Thus, the I/O processing unit communicates with the intelligent node (e.g., the switch controller) which performs the desired function. Alternatively, the two functions, i.e., I/O

[6] Bronstein, Abstract.
[7] See Specification, Background, page 2, first full paragraph.
[8] Bronstein, col. 6, lines 43-52.

> processing unit and intelligent node, may be separated, physically located in different boxes or across a network. For example, in the networking context, an edge device or NIC may transmit frames with the tag appended over the network to a router that processes the frames.[9] (Emphasis added.)

One other somewhat indirect reference to routing in Bronstein is with regard to Bronstein's header analyzer:

> If a match is not found, the header with tag is placed in the slow queue 132 in a tag queue 136 that is used for that particular tag only. Eventually, the header processor 140 reads the slow queue and attempts to forward the frame using conventional means within the header processor including looking in a forwarding database for a match on the destination address.[10] (Emphasis added.)

Use of a forwarding database could be construed as one part of routing, and thus Bronstein's header analyzer could be construed as performing routing.

Bronstein's forwarding decision processor is disclosed as determining a forwarding decision, such as "the first time a tag is used or when the new_tag_bit is set in the header," but there is no disclosure as to how the forwarding decision processor determines a forwarding decision.[11] Nor is Bronstein's forwarding decision processor disclosed to determine or to use a routing table identifier or results of a routing search as part of its operation. In any event, frames are sent from Bronstein's header analyzer to Bronstein's forwarding decision processor only when the header analyzer is not able to forward them[12], and thus it would make little sense for both the header analyzer and the forwarding decision processor to perform routing.

In short, if there is any routing in Bronstein, it is in Bronstein's header analyzer. Further, there is no other discussion in Bronstein of routing tables (other than the "forwarding database" of the header analyzer which might be construed as such), or of a routing table or a routing search being done by any other part of Bronstein's flow switching apparatus.

The applicant's claim 1 recites (emphasis added):

> *using a first processor in the network access server to perform a routing table lookup for a received packet;*
>
> *determining, from the results of the routing table lookup, a routing table identifier and a second processor responsible for processing and forwarding the received packet,*

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[9] Bronstein, col. 12, lines 48-62.
[10] Bronstein, col. 14, lines 22-28.
[11] Bronstein, col. 13, lines 8-41.
[12] Bronstein, col. 14, lines 22-40.

the second processor selected from a plurality of forwarding processors in the network access server;

passing the identifier and the received packet to the second processor; and

the second processor retrieving routing information for the received packet from a routing table, using the identifier to determine the location of the routing information in the routing table.

(with similar elements in claims 9, 14, and 15). Cleary, this requires two processors, the first of which performs "a routing table lookup" to determine "a routing table identifier and a second processor," and the second of which (determined by the first) retrieves "routing information … from a routing table, using the identifier to determine the location of the routing information in the routing table."

As noted by the examiner, in Bronstein "the forwarding decision processor 112, in addition to the processing unit 116-fig.7, is responsible for forwarding packets."[13] However, there is no indication in Bronstein that any portion of Bronstein's apparatus, other than Bronstein's header analyzer, performs a routing table lookup or retrieves routing information from a routing table. Furthermore, there is absolutely no suggestion that any of Bronstein's header analyzer, forwarding decision processor, and I/O processing unit provides a routing table identifier (or results of a routing search) to any other (second) processor so that the other processing unit can retrieve information from a routing table using the routing table identifier (or the results of a routing search).

Bronstein's **I/O processing unit** cannot be construed as being the applicant's first processor, because Bronstein, either alone or in combination with the APA, does not teach or suggest that Bronstein's I/O processing unit determines "from the results of the routing table lookup" "a second processor responsible for processing and forwarding the received packet" (as recited in the applicant's claim 1 (with similar elements in claims 9, 14, and 15). Bronstein discloses that Bronstein's I/O Processing Unit merely appends the tag, and Bronstein's switch controller determines the destination:

> Once a flow ID and tag ID have been assigned and the tag has been appended to the frame, the I/O processing unit transmits the frame to the switching fabric. The switching fabric is operative to transmit the frame header to the switch controller. The switch

[13] Office Action, page 3.

> controller returns the forwarding decision to the switching fabric and the frame is subsequently forwarded to the appropriate port.[14]

Bronstein's **header analyzer** cannot be construed as being the applicant's first processor, because Bronstein, either alone or in combination with the APA, does not teach or suggest that Bronstein's header analyzer determines "from the results of the routing table lookup" "a routing table identifier" that is passed to a second processor, and where the second processor uses the routing table identifier for ""retrieving routing information" as recited in the applicant's claim 1 (with similar elements in claims 9, 14, and 15).

There is comparatively little disclosure in Bronstein of Bronstein's **forwarding decision processor**. There is no teaching or suggestion in Bronstein, either alone or in combination with the APA, that would let Bronstein's forwarding decision processor be construed as the applicant's first processor or second processor. For example, Bronstein, either alone or in combination with the APA, does not teach or suggest that Bronstein's forwarding decision processor retrieves "routing information for the received packet from a routing table, using the identifier to determine the location of the routing information in the routing table" as recited in the applicant's claim 1 (with similar elements in claims 9, 14, and 15).

Bronstein's tag cannot be construed as being the applicant's routing table identifier (or results of a routing search), because Bronstein, either alone or in combination with the APA, does not teach or suggest that Bronstein's tag is (a) determined "from the results of the routing table lookup", and (b) used by a "second processor" for "retrieving routing information" as recited in the applicant's claim 1 (with similar elements in claims 9, 14, and 15). Bronstein's tag is appended only by Bronstein's I/O processing unit,[15] which is not disclosed to perform routing. Bronstein's header analyzer (the only portion of Bronstein that can be construed as performing routing) does not use Bronstein's tag in conjunction with Bronstein's forwarding database:

> Eventually, the header processor 140 reads the slow queue and attempts to forward the frame using conventional means within the header processor <u>including looking in a forwarding database for a match on the destination address</u>.[16]

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[14] Bronstein, col. 8, lines 31-37.
[15] Bronstein, col. 7, lines 66-67.
[16] Bronstein, col. 14, lines 24-28.

Further with regard to **claim 14**, it is currently amended to emphasize advantageous operation of the distributing means for performing a routing search for a data packet received from the packet data network. Thus the claim recites, "the respective forwarding means enabled to use the result of the routing search to retrieve information from a routing table." In this way, the results of the first search are leveraged, allowing the selected forwarding engine to locate the routing table entry it needs to process the packet without having to perform a second search of the routing table.[17]

Similar advantages can be gained in the NAS of **claim 9**, as it includes, as currently amended:

a distribution engine to perform respective routing searches for ~~data~~ each of a plurality of packets received at the at least one egress port, and to distribute each ~~such~~ of the packets, along with ~~the~~ respective results of the respective routing search, to a respective one of the forwarding engines supporting data communication for the ingress port access session associated with ~~that~~ the packet, ***the respective forwarding engine retrieving routing information for the packet from a routing table using the respective results***.

The applicant is unable to find any combination of the APA and Bronstein that teaches or suggests all of the elements of any of the applicant's claims 1, 9, 14, or 15. Accordingly, as the APA and Bronstein, either alone or in combination, do not teach or suggest all of the elements of any of the applicant's claims 1, 9, 14, or 15, claims 1, 9, 14, and 15 are in condition for the examiner's allowance for at least this reason.

As dependent claims 2-8, 10-13, and 16-22 incorporate all of the elements of a respective one of independent claims 1, 9, 14 and 15, dependent claims 2-8, 10-13, and 16-22 are in condition for the examiner's allowance for at least this reason.

New Claims

New claims 23-27 are dependent on a respective one of independent claims 1 and 9. As independent claims 1 and 9 are allowable per the remarks above, dependent claims 23-27 are also in condition for the examiner's allowance for at least this reason.

[17] See Application as filed, page 6, lines 16-25.

Conclusion

For the foregoing reasons, the applicants request reconsideration and allowance of the remaining claims. The applicants encourage the examiner to telephone the undersigned at (503) 224-2170 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

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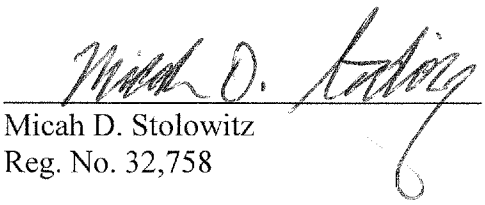

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